Maaz Bin Safeer Ahmad

7552 43rd Ave S, Unit A, Seattle, WA 9818, USA
mahmad@adobe.com • maazsafeer.com

RESEARCH INTERESTS

My research encompasses three central themes. Firstly, I design programming tools to ease the development of high-performance programs, with a focus on compilers and program synthesis. Secondly, I research techniques for improving program correctness through computer-assisted testing and automatic program verification. Lastly, I am interested in empowering designers by creating domain-specific programming languages, improving expressivity and accessibility in design.

EDUCATION

University of Washington, Seattle, Washington, USA

Doctor of Philosophy (Ph.D.) in Computer Science & Engineering — August 2022
- Advised by Dr. Alvin Cheung
- Research areas: Programming Systems, Program Synthesis, and Compilers

Master of Science (M.S.) in Computer Science & Engineering — June 2021
- Advised by Dr. Alvin Cheung
- Research areas: Verified Lifting, Porting Legacy Software

National University of Computer & Emerging Sciences, Lahore, Punjab, Pakistan

Bachelor of Science (B.S.) *cum laude* in Computer Science — July 2014
- Thesis adviser: Dr. Kashif Zafar
- Awarded the University Silver Medal

PUBLICATIONS

[1] M. Kodnongbua, B. T. Jones, M. B. S. Ahmad, V. G. Kim, A. Schulz, "ReparamCAD: Zero-shot CAD Program Re-Parameterization for Interactive Manipulation," *SIGGRAPH Asia 2023 (To appear)*

[2] A. J. Root, M. B. S. Ahmad, D. Sharlet, A. Adams, S. Kamil, J. Ragan-Kelley, "Fast Instruction Selection for Fast Digital Signal Processing," *ASPLOS 2023*

[3] A. Cheung, M. B. S. Ahmad, B. Haynes, C. Kittivorawong, S. Laddad, X. Liu, C. Wang, C. Yan, "Towards Auto-Generated Data Systems," *VLDB 2023*

[4] M. B. S. Ahmad, A. J. Root, A. Adams, S. Kamil, J. Ragan-Kelley, "Vector Instruction Selection for Digital Signal Processors using Program Synthesis," *ASPLOS 2022*

[5] M. B. S. Ahmad, J. Ragan-Kelley, A. Cheung and S. Kamil, "Automatically Translating Image Processing Libraries to Halide," *SIGGRAPH Asia 2019*

[6] M. B. S. Ahmad and A. Cheung, "Automatically Leveraging MapReduce Frameworks for Data-Intensive Applications," *SIGMOD 2018*

[7] M. B. S. Ahmad and A. Cheung, "Optimizing Data-Intensive Applications Automatically By Leveraging Parallel Data Processing Frameworks," *SIGMOD 2017 (Demo)* – **Honourable Mention for Best Demo Award**

[8] G. Fedyukovich, M. B. S. Ahmad and R. Bodik, "Gradual Synthesis for Static Parallelization of Single-Pass Array-Processing Programs," *PLDI 2017*

[9] M. B. S. Ahmad and A. Cheung, "Leveraging Parallel Data Processing Frameworks with Verified Lifting," *SYNT 2016* – **Best Student Paper Award**

[10] T. Ahmad, N. A. Rehman, F. Pervaiz, S. Kalyanaraman, M. B. S. Ahmad, S. Chakraborty, L. Subramanian, U. Saif, "Characterizing dengue spread and severity using internet media sources," *ACM DEV 2013*

WORK EXPERIENCE

Adobe Research, Seattle, USA — September 2021 - Present

Research Scientist, Imaging and Language Group

Planning and executing long-term programming languages research agenda at Adobe. Working with interns and academic faculty to facilitate collaborations and innovation. Developing high-performance and verifiably correct programming systems and languages to empower Adobe products.

Intel, Hillsboro, USA — Summer 2019

Research Intern, Software Path-finding Group

Developed a proof-of-concept compiler that uses program synthesis to automatically optimize *intentional* C++ code, i.e. code lacking any performance optimizations, by lifting the intentional code to domain-specific languages.

Adobe Research, Cambridge, USA — July 2017 – December 2017

Research Intern, Creative Technologies Lab

Developed Dexter, a compiler that uses program synthesis and verification to rejuvenate legacy image-processing libraries by translating individual functions, written in C++, to the Halide DSL.

Tableau Software, Kirkland, USA — Summer 2015

Software Engineer Intern, Data Management Team

Implemented a new feature in the Tableau Data Engine to improve the incremental extract refresh process for time-window extracts.

TEACHING EXPERIENCE

University of Washington, Seattle, USA

Teaching Assistant

- CSE 402: Design and Implementation of DSLs. Taught by Ras Bodik. — Spring 2019
- CSE 401: Compiler Construction. Taught by Ras Bodik and Alvin Cheung. — Winter 2016

Undergraduate Tutor (Volunteer)

- CSE 344: Database Systems. Taught by Alvin Cheung. — Winter 2017

National University of Computer & Emerging Sciences, Lahore, Pakistan

Teaching Assistant

- CS 211: Discrete Structures. Taught by Sarfraz Raza. — Fall 2013
- CS 103: Computer Programming. Taught by Sarim Baig. — Spring 2013

ACADEMIC AWARDS

Distinguished Artifact Reviewer, OOPSLA 2020
Recognized as a distinguished member of the OOSPLA Artifact Evaluation Committee.

Student Travel Award, SYNT 2016
Funding to attend and present our work at the SYNT' 16 Workshop.

University Silver Medal, NUCES
For achieving the second highest GPA over the four year B.S. program.

Dean's List, Fall 2010 through Spring 2014, NUCES
For attaining a semester GPA of at least 3.50.

Intra-FAST Annual Speed Programming Competition, NUCES
First prize in year 2011, 2012 and 2013.

SERVICE

SIGGRAPH Asia — 2023
Reviewer - Technical Papers

OOPSLA — 2020
Artifact Evaluation Committee

ASPLOS — 2020
Artifact Evaluation Committee

VLDB 2020
Reviewer - Demo Track

ACM 5th Symposium on Computing for Development, San Jose, USA 2015
Student Volunteer

Pakistan-ICTD Workshop, Lahore, Pakistan 2014
Student Volunteer

SOFTEC, Lahore, Pakistan 2013
IT Team Head

LANGUAGES

English: Fluent (speaking, reading, writing).
Urdu: Fluent (speaking, reading, writing).

OTHER INTERESTS

Mountaineering. I was fortunate enough to climb Sahale Peak, Ruth Mountain, Mt. Baker and Sloan Peak over the past few years.
Reading. Malazan Book of The Fallen by Steven Erikson is my current all-time favourite series.

[*CV compiled on 2023-10-25*]